Tacoma-Pierce County Health Department
Arsenic Project

What are arsenic and lead?

Arsenic is a naturally occurring element in the earth's crust. Pure arsenic is gray and metal-like, but it is usually found combined with one or more other elements such as oxygen, chlorine and sulfur. Arsenic combined with these elements is referred to as inorganic, whereas arsenic combined with carbon and hydrogen is organic arsenic. Many arsenic-containing substances, both organic and inorganic, are naturally occurring. Others are man-made. The organic forms of arsenic are generally less toxic than the inorganic forms.

Lead is also a naturally occurring element. It is a dense, bluish gray metal which was one of the first known elements used by man. Lead ranks about 36th in natural abundance in the Earth's crust.

Arsenic and lead have been found together in soils in the Tacoma Smelter Plume study area. The ores that were smelted for copper at the Ruston smelter contained both metals, which were released into the environment through smokestack emissions during the smelting process.

How big was the Tacoma Smelter Plume?

One likely source of the arsenic and lead contamination in Pierce and King Counties was the now-closed Asarco copper smelter in Ruston, which operated between 1905 and 1986. The property of the smelter and immediately surrounding lands were declared an Environmental Protection Agency Superfund site in 1983. The soil contaminants derive from smelter smokestack emissions and were likely wind borne far from the smelter itself. We do not know how far from the smelter the contamination is deposited. The prevailing wind direction in the area of the smelter is southwest-to-northeast in winter and northeast-to-southwest in summer, therefore areas of Pierce and King Counties in those directions from the smelter are likely to be affected the most.

The Department of Ecology and Tacoma-Pierce County Health Department will be conducting a study in 2002 to evaluate the extent, or "footprint" of the plume in Pierce County. A study of the King County mainland is scheduled for release in the spring of 2002. The footprint studies will concentrate on undeveloped/undisturbed and developed properties to provide the most accurate picture of the area that was influenced by the smelter.

Preliminary data indicate that elevated arsenic is found in soils as far away from the smelter as the town of University Place to the south, and I-90 to the north. Higher contamination is found closer to the smelter.

How might I be exposed to arsenic and lead in soil?

Exposure will occur only if someone ingests or inhales the contaminated soil. Getting the soil on your skin is not considered a risk, since arsenic and lead in the soil are not absorbed very well through the skin. The main concern is that some people may swallow contaminated soil, especially young children who are unaware of the hazards and are likely to be exposed to the soil through normal play activities. Most young children put their hands, toys, or other objects in their mouths, and these often have small amounts of soil and dust on them that the child swallows. Some children directly swallow large amounts of soil. Older children and adults can also swallow small amounts of soil that is on hands, food, or other objects that come into contact with the mouth. Also, contaminated dirt or dust that is suspended by wind, lawn mowers, leaf blowers, vacuum cleaners, and other means can get into a person's nose or mouth and be swallowed or inhaled.

Community Protection Measures

Child focused measures

In order to reduce the risks of exposure to potential contamination:

- Keep children from playing in bare soil that is possibly contaminated with arsenic or lead. Covering areas of bare soil with grass, wood chips or other clean material can reduce exposure.
- Teach children not to put dirty hands in or near their mouths.
- Encourage your children to wash their hands and faces after playing outdoors.
- Damp mop and dust your house frequently to reduce your child's contact with contaminated dust.
- Make sure your child eats a well-balanced diet. Children who have enough iron and calcium in their diet, as well as a low fat diet, are less likely to absorb lead from their environment.
- Maintain the painted surfaces on the inside and outside of your home (if it was built prior to 1980) to avoid exposure to lead paint chips and dust.

Adult-family focused measures

The following measures may also help reduce exposure risks:

- Don't eat, drink, smoke, or chew any material while gardening or working in the soil.
- Wash your hands and face after being outdoors and before eating or drinking
- Dampen exposed soil to minimize dust. If you can see dust in the air, you are probably breathing and swallowing it. Wear a dust mask for maximum protection.
- Wear shoes and gloves when working in your yard. Leave them outside before entering your home.
- Wash hands after working in contaminated soil.
- After digging in contaminated soil, wash clothing separately from other items.
- Prevent pets from tracking soils into your home. Keep them out of areas with exposed dirt.
- Wash fruits and vegetables before eating.

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